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PARK PLAZA STUDY

Draft report of a study of the project's potential impacts on construction labor in metropolitan Boston.

June 20, 1975.

OBJECTIVE:

This phase of the study addresses itself to the range of potential impacts of the five development program alternatives on the construction labor force of metropolitan Boston and to the potential range of impacts possible within each development program alternative.

METHODOLOGY:

- o DEMAND: For each development program alternative, two models were established: one reflecting a labor intensive design (cast in place concrete/ masonry enclosure/ etc) and the other reflecting a design which was not labor intensive (steel frame/ metal decks/ metal and glass enclosure/ etc.) From these models, craft profiles were calculated and superimposed on schedules established elsewhere in TSA's report to produce estimates of total and annual demand for craft labor. Those calculations are displayed for each of seven major crafts and in an eighth category which represents all the other crafts, FIGURES 1-10 (YELLOW) AND 11-20 (BWE)
- o SUPPLY: Current trade populations and corresponding unemployment figures for Boston were established from direct interviews with personnel in 17 individual craft unions and with

Park Plaza

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representatives of contractor and labor councils in Boston.

FIGURE 2
(pink)

ASSUMPTIONS:

- o UNION LABOR: The scale of even the smallest alternative program suggests that the work will be done by union workers, and the calculations assume that it will.
- o STABILIZED LABOR POPULATION: The work force has remained essentially constant in the Boston area in recent years and this study assumes that constancy will continue.
- o LINEAR PROGRESS: This study accepts the approximation that the work will go forward in a more or less uniform way, and calculations of annual labor demand are made by dividing the estimated total demand by the estimated total construction time in years.
- o ALL DEVELOPMENT IS NEW: This study interpreted the programs to mean the all work identified as "new development" was new construction, and that renovation of existing buildings was not included. Construction labor demand for such renovation work would have to be added to the estimated demand identified in this report.

FINDINGS:

At the summary level, the study shows a current construction labor force in Boston of about 25,000, of which about 75% are currently employed. The development program alternatives were

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found to represent somewhere between a little over 200 jobs and just under 500 jobs over periods ranging from about 2-1/2 years to about 9 years.

The labor consuming characteristics of the five basic space types which comprise the alternatives are analyzed and are displayed in figures 1 through 10 inclusive (yellow.)

Those labor consumption data are superimposed on profiles of the development programs themselves to show total annual labor demands and to show annual labor demand by craft in figures 11 through 20 inclusive (blue.) Significant excerpts from the latter findings are, these:

- o The smallest development program alternative, 2M, can be expected to require an average of about 218 construction workers over about 2-1/2 years if it is designed in the non-intensive mode and about 265 workers in the labor intensive mode. In the non-intensive approach the highest demand would be for ironworkers, whose population would average about 56 throughout the project (with much higher peaks) a figure which represents ~~xxx~~ about 11% of the present ironworker unemployment in Boston.
- o In the labor intensive approach, the carpenters would dominate, with ~~xxxxx 82 xxx~~ an average of about 92 men, roughly 50% of the currently unemployed caprenters in Boston.
- o Alternative 3M will require about 229 men in the low labor mode and about 290 men in the high labor mode. Ironworkers and carpenters, respectively, 62 and 104, on average. This alternative represents about 6.5 years at these average levels, where

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- alternative 2M was calculated for 2-1/2 years.
- o Alternative 4M, also 6.5 years, shows 363 jobs in the non-intensive mode, 456 in the intensive. Ironworkers 95, carpenters 161, average through the life of the project.
 - o Alternative 5M demands more labor, of course, but has been stretched out to 9 years, so the average annual demand in the non-intensive approach drops back to 343 and in the intensive approach it drops to 432. Ironworkers 90, carpenters 151.
 - o In the largest development program alternative, 6M, the average annual demand over 9 years was calculated to be about 392 men in the low intensity approach and about 495 in the labor intensive approach. In this scheme, the ironworkers in the non-intensive mode would average about 106 men, about 21% of their current unemployment in Boston, and the carpenters in the labor intensive design would average about 176 men over 9 years, a figure which actually represents all the men they currently have unemployed in the Boston area.

CONCLUSIONS:

- o An annual demand averaging 500 workers represents only about 2% of the Boston construction force. Even allowing a peak of 2-1/2 times the average annual demand would only represent

With an existing unemployment rate of about 25% the likelihood is that this project can represent

- There is evidence that an approximately 25% increase in construction jobs resulting from labor intensifying the design, as calculated in this study, can be achieved without increase in total construction cost.

FIGURE 1 6-20-75													BRA - PAPER AREA		B.T. REMAINING	
													L.H.		HIGH	
STRUCTURE	15	65	10.0	5.0	—	1.0	3.0	—	—	—	—	1.0				
ENCLOSURE	3	65	1.0	0.2	0.8	0.3	—	—	—	—	—	0.7				
PTNS/FINISH	6	65	4.0	2.5	—	0.5	—	—	—	—	—	1.0				
STAIRS	1	50	0.5	0.3	—	0.1	0.1	—	—	—	—	—				
ELEVATORS	1	33	0.3	—	—	—	—	—	—	—	—	0.3				
SOLATS/EQPT	3	50	1.5	1.0	—	0.2	—	—	—	—	—	0.3				
PLUMBING	1	60	0.6	—	—	—	—	0.6	—	—	—	—				
HVAC	5	40	1.0	—	—	—	—	—	1.0	—	—	—				
ELEVATOR	4	50	1.0	—	—	—	—	—	—	—	1.0	—				
SIGNEBOARD	1	50	0.5	—	—	0.3	—	—	—	—	—	0.2				
TOTAL COST	40	58.12	23.4	9.0	0.8	1.4	3.1	0.6	1.0	1.0	2.0	3.5				
MAN HOURS	—	—	—	—	—	—	—	—	—	—	—	—				
11H / 1000 S.F.	—	—	—	600	53	200	207	40	133	133	233	—				

FIGURE 2
6-20-75

										B.R.A. - PAPER PLAZA		B.T. OFFICE 1/2	
										L.I. HIGH			
	ESTIMATED CONST. COST \$ PER S.F.	% FIELD LABOR	\$ FIELD LABOR	CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PUMBERS	STN. FITTERS	ELECTRICIANS	ALL OTHERS		
STRUCTURE	17	65	11-	5.5		1.1	3.3				1.1		
ENCLOSURE	4	65	2.6		1.6	0.7	0.1				0.2		
PTNS/FINISH	7	65	4.6	3.0		0.6					1.0		
STAIRS	1	50	0.5	0.3		0.1	0.1						
ELEVATORS	3	33	1.0								1.0		
SOCIALS/EQPT	1	50	0.5	0.3		0.1					0.1		
PUMBING	2	60	1.2					1.2					
HVAC	7	40	2.8						2.8				
ELECTRIC	5	40	2.0							2.0			
SITEMORR	1	50	0.5			0.3					0.2		
TOTAL COST	48	55.6%	26.7	9.1	1.6	2.9	3.5	1.2	2.8	2.0	3.6		
MANHOURS													
MH/MSE				607	107	242	233	80	187	133	240		
TOTAL 8729 MH/MSE													

										BPA - PAPER PLAZA		EST. ADTS	
												L-1: HIGH	
		ESTIMATED CONST. COST. \$ PER S.F.	% FIELD LABOR	# FIELD LABOR	CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PUMBERS	STMFITTERS	ELECTRICIANS	ALL OTHERS	
STRUCTURE	15	6.5	10.0	5.0		1.0	3.0					1.0	
ENCLOSURE	4	6.5	2.6			1.6	0.7	0.1				0.2	
PTNS/FINISH	5	6.5	3.3	2.4			0.6					0.3	
STAIRS	1	5.0	0.5	0.3			0.1	0.1					
ELEVATORS	2	3.3	0.6									0.6	
SPECS/EQPT	1	5.0	0.3	0.3									
PUMBINQ	3	6.0	1.8						1.8				
AVAC	2	6.0	1.2							1.2			
ELECTRIC	1	7.0	0.7								0.7		
SITEMOBI	1	5.0	0.5				0.3					0.2	
TOTAL COST	36		21.5	8.0	1.6	2.7	3.2	1.8	1.2	0.7	2.3		
MANHOURS													
M/H/MSE				533	107	225	213	120	80	47	153		

6

[illegible]

FIGURE 7
6-20-75

FIGURE 6-20-75											
L											
ESTIMATED CONST. COST \$ PER S.F.											
% FIELD LABOR											
\$ FIELD LABOR											
CARPENTERS											
BRICKLAYERS											
LABORERS											
IRONWORKERS											
PUMBERS											
STAMP FITTERS											
ELECTRICIANS											
ALL OTHERS											
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B.T. OFFICES 1/F											
L/H LOW											
MAN HOURS											
TOTAL COST											
11H/MSF											

FIGURE 8
6-20-75

	ESTIMATED CONST. COST \$ PER S.F.	% FIELD LABOR	\$ FIELD LABOR	CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PUMBERS	STMFITTERS	ELECTRICIANS	ANNOOTHERS
STRUCTURE	15	45	6.8	140		0.6	3.4				0.6
ENCLOSURE	4	33	1.3				1.0				0.3
PTNS/FINISH	5	65	3.3	14		0.6					0.3
STAIRS	1	40	0.4				0.4				
ELEVATORS	2	33	0.6								0.6
SOCIALS/EQPT	1	50	0.3	0.3							
PLUMBING	3	60	1.8					1.8			
HVAC	2	60	1.2						1.2		
ELECTRIC	1	70	0.7							0.7	
SITEMOAT	1	50	0.5			0.3					0.2
TOTAL COST	35	48.3%	16.9	47	—	1.5	5.0	1.8	1.2	0.7	2.0
MANHOURS											
MH/MSE				313	—	125	333	120	80	47	133

BRA - PAPER PLANS

B.T. APPTS

L.I. LOW

[illegible]

FIGURE 10
6-20-75

[illegible]

BRA PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

SPACE TYPE	GSF	ALTERNATIVE: 2M							
		MATERIALS OPTION: HIGH LABOR							
		CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PLUMBERS	STAFFERS/SMW	ELECTRICIANS	ALL OTHERS
RETAIL	47000	28.2	2.5	9.4	9.7	1.9	6.3	6.3	11.0
OFFICE	351500	213.4	37.6	85.1	81.9	28.1	65.7	46.7	84.4
APARTMENTS	407500	217.2	43.6	91.7	86.8	48.9	32.6	19.2	62.4
PARKING	—								
HOTEL	—								
TOTAL	806000	458.8	83.7	186.2	178.4	78.9	104.6	72.2	157.8
ANNUAL MH BASED ON 2.5 YEARS		183.5	33.5	74.5	71.4	31.5	41.8	28.9	63.1
AVG NO. MEN BASED ON 2000 HRS/YR		91.8	16.8	37.3	35.7	15.8	20.9	14.4	31.6

1.938
2694.4 MEN
2.5 YEARS

BRA. PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

SPACE TYPE	GSF	ALTERNATIVE: 3M							
		MATERIALS OPTION: HIGH LABOR							
RETAIL	199,050	119.4	10.6	39.8	41.2	7.9	26.5	26.5	46.4
OFFICE	550,635	334.2	58.9	133.3	128.3	44.1	102.9	73.2	132.2
APARTMENTS	895,000	477.0	95.8	201.4	190.6	107.4	71.6	42.1	136.9
PARKING	551,090	198.3	—	36.9	110.2	7.2	—	18.1	66.1
HOTEL	320,000	221.8	34.2	93.4	74.6	76.8	59.8	51.2	70.4
TOTAL	2,515,775	1350.7	199.5	504.8	544.9	243.4	260.8	211.1	452.0
ANNUAL MH BASED ON 6.5 YEARS		207.8	30.7	77.7	83.8	37.4	40.1	32.5	69.5
AVG NO. MEN BASED ON 2000 HRS/YR		103.9	15.3	38.8	41.9	18.7	20.0	16.2	34.8

1,491 MILES
- 9.9 NEW
- 20-612 YRS

BRA. PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

ALTERNATIVE: 4-M
MATERIALS OPTION: HIGH LAIDR

SPACE TYPE	GSE	CARPENTERS	BRICKMAERS	LABORERS	IRONWORKERS	PLUMBERS	STAFFERS/SMW	ELECTRICIANS	ALL OTHERS
RETAIL	252000	151.2	13.4	50.4	52.2	10.1	33.5	33.5	58.7
OFFICE	1092000	662.8	116.8	264.2	254.4	87.4	204.2	145.2	262.1
APARTMENTS	1175000	626.3	125.7	264.4	250.3	141.0	94.0	55.2	179.8
PARKING	609000	219.2	—	40.8	121.8	7.9	—	20.1	73.1
HOTEL	618500	428.6	66.2	180.6	144.1	148.4	115.7	98.9	136.1
TOTAL	3746500	2088.1	322.1	800.4	822.8	394.8	447.4	352.9	709.8
ANNUAL MH BASED ON <u>6.5</u> YEARS		321.2	49.6	123.1	126.6	60.7	68.8	54.3	109.2
AVG NO. MEN BASED ON 2000 HRS/YR		160.6	24.8	61.6	63.3	30.4	34.4	27.1	54.6

1.585 m/h
A 56.8 MEN
FOR 6.5 YRS

BRA PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

		ALTERNATIVE: <u>5th</u>								
		MATERIALS OPTION: <u>HIGH LABOR</u>								
SPACE TYPE	GSI	CARPENTERS	BRICKMASTERS	LABORERS	IRONWORKERS	PLUMBERS	STAFFERS/SINK	ELECTRICIANS	ALL OTHERS	
RETAIL	321 000	192.6	17.0	64.2	66.4	12.8	42.7	42.7	74.8	
OFFICE	1915500	1162.7	204.9	463.6	446.3	153.2	358.2	254.8	459.7	
APARTMENTS	1285000	684.9	137.5	289.1	273.7	154.2	102.8	60.4	196.6	
PARKING	782000	281.5	—	52.4	156.4	10.2	—	25.8	93.8	
HOTEL	581000	402.6	62.2	169.7	135.4	139.4	108.7	92.9	127.8	
TOTAL	4884500	2724.3	421.6	1039.0	1078.2	469.8	612.4	476.6	952.7	
ANNUAL MH BASED ON <u>9.0</u> YEARS	302.7	46.8	115.4	119.8	52.2	68.0	52.9	105.9		
AVG NO. MEN BASED ON 2000 HRS/YR	151.4	23.4	57.7	59.9	26.1	34.0	26.5	53.0		

11592 MH/10
A32 MEN
FOR 9 YRS

BRA PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

ALTERNATIVE: GM
MATERIALS OPTION: HIGH LABOR

SPACE TYPE	GSE	CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PLUMBERS	STMFIRS/SMW	ELECTRICIANS	ALL OTHERS
RETAIL	352000	211.2	18.7	70.4	72.9	14.1	46.8	46.8	82.0
OFFICE	1823500	1106.9	195.1	441.3	424.9	145.9	340.9	242.5	437.6
APARTMENTS	1945000	1036.7	208.1	437.6	414.3	233.4	155.6	91.4	297.6
PARKING	1144000	411.8	—	76.7	228.8	14.9	—	37.8	137.3
HOTEL	581000	402.6	62.2	169.7	135.4	139.4	108.6	92.9	127.8
TOTAL	5845500	3169.2	484.1	1195.7	1276.3	547.7	651.9	511.4	1082.3
ANNUAL MH BASED ON 9.0 YEARS		352.1	53.8	132.9	141.8	60.9	72.4	56.8	120.3
AVG NO. MEN BASED ON 2000 HRS/YR		176.0	26.9	66.4	70.9	30.4	36.2	28.4	60.1

1.526 MH/H
495.3 MEN
FOR 9 HRS

BRA. PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

ALTERNATIVE: 2M
MATERIALS OPTION: LOW LABOR

SPACE TYPE	GSI	CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PLUMBERS	STAFFERS/SMUW	ELECTRICIANS	ALL OTHERS
RETAIL	47000	17.3	—	6.3	15.4	1.9	6.1	6.1	8.5
OFFICE	351500	112.5	—	43.9	129.0	28.1	65.7	46.8	84.4
APARTMENTS	407500	127.6	—	50.9	135.7	48.9	32.6	19.2	54.2
PARKING	—	—	—	—	—	—	—	—	—
HOME	—	—	—	—	—	—	—	—	—
TOTAL	806000	257.2	—	101.1	280.1	78.9	102.4	72.1	147.1
ANNUAL NH BASED ON $\frac{2.5}{100}$ YEARS	103.0	—	—	40.4	112.0	31.6	41.8	28.8	58.8
AVG NO. MEN BASED ON 2000 ¹¹⁸⁵ /YR	51.5	—	—	20.2	56.0	15.8	20.9	14.4	29.4

1041.1 " NH/1P
1.29 MEN
298
X 2.12 X PS

BRA. PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

SPACE TYPE	GSE	ALTERNATIVE: 3M							
		MATERIALS OPTION: LOW LABOR							
		CARPENTERS	BRICKMASTERS	LABORERS	IRONWORKERS	PLUMBERS	STAFFERS/SMW	ELECTRICIANS	ALL OTHERS
RETAIL	199050	73.1	—	26.5	65.1	8.0	25.9	25.9	35.9
OFFICE	550635	176.2	—	68.8	202.1	44.1	103.0	73.2	132.2
APARTMENTS	895000	280.1	—	111.9	298.0	107.4	71.6	42.1	119.0
PARKING	551090	88.2	—	27.6	128.4	7.2	—	18.2	51.3
HOTEL	320000	147.2	—	61.4	111.0	76.8	59.8	51.2	61.8
TOTAL	2515775	764.8	—	296.2	804.6	243.5	260.3	210.6	400.2
ANNUAL MH BASED ON 6.5 YEARS		117.6	—	45.6	123.8	37.5	40.1	32.4	61.6
AVG NO. MEN BASED ON 2000 HRS/YR		58.3	—	22.8	61.9	18.7	20.0	16.2	30.8

2930.2 MH
11.5 MH/YR
228.1 MEN

BRA PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

ALTERNATIVE: 4M
MATERIALS OPTION: LOW LABOR

SPACE TYPE	GSE	CARPENTERS	BRICKMASTERS	LABORERS	IRONWORKERS	PLUMBERS	STAFFERS/SMIN	ELECTRICIANS	ALL OTHERS
RETAIL	252000	92.5	—	33.5	82.4	10.1	32.8	32.8	45.4
OFFICE	1092000	349.4	—	136.5	400.8	87.4	204.2	145.2	262.1
APARTMENTS	1175000	367.8	—	146.9	391.3	141.0	94.0	55.2	156.3
PARKING	609000	97.4	—	30.5	141.9	7.9	—	20.1	56.6
HOTEL	618500	284.5	—	118.8	214.6	148.4	115.7	99.0	119.4
TOTAL	3726500	1191.6	—	466.2	1231.0	394.8	446.7	352.3	639.8
ANNUAL MH BASED ON <u>6.5</u> YEARS	183.3	—	—	71.7	189.4	60.7	68.7	54.2	98.4
AVG NO. MEN BASED ON 2000 ^{HRS} /YR	191.6	—	—	35.9	94.7	30.4	34.4	27.1	49.2

472.4 MH
1.26 MH
303.3 MEN

ALTERNATIVE: 5M
MATERIALS OPTION: LOW LAND

[illegible]

BRA. PARK PLAZA STUDY: MAN HOURS (IN THOUSANDS)

SPACE TYPE	GSF	ALTERNATIVE: <u>GM</u>							SHT 10 OF
		CARPENTERS	BRICKLAYERS	LABORERS	IRONWORKERS	PLUMBERS	STAINERS/STAIN	ELECTRICIANS	
RETAIL	352000	129.2	—	46.8	115.1	14.1	45.8	45.8	63.4
OFFICE	1823500	583.5	—	227.9	669.2	145.9	341.0	242.5	437.6
APARTMENTS	1945000	608.8	—	243.1	647.7	233.4	155.6	91.4	258.7
PARKING	1144000	183.0	—	57.2	266.6	14.9	—	37.8	106.4
HOTEL	581000	267.3	—	111.6	201.6	139.4	108.7	93.0	112.1
TOTAL	5845500	1771.8	—	686.6	1900.2	547.7	651.1	510.5	978.2
ANNUAL MH BASED ON 9.0 YEARS		196.9	—	76.3	211.1	60.9	72.4	56.7	108.7
AVG NO. MEN BASED ON 2000 HRS/YR		98.5	—	38.2	105.6	30.4	36.2	28.4	54.4

1046.1 MMH
 $= 1205 \text{ MMH}$
 291.7 MEN
 291.7 MEN

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	CURRENT MEMBERSHIP	ESTIMATED CURRENT UNEMPLOYMENT	
CARPENTERS	1165	175	
BRICKMASTERS	1700	595	
LABORERS	3500	700	
IRONWORKERS	1700	510	
PLUMBERS	1400	420	
STAFFERS + SHIMILAKES	2900	580	
ELECTRICIANS	2400	720	
ANOTHERS *	9880	2480	
TOTAL	24645	6180 (25.1% UNEMPLOYED)	
<p>LOW INTENSITY SCHEMES WOULD EMPLOY FROM ABOUT 211 TO ABOUT 386 MEN ANNUALLY OR FROM ABOUT 1% TO 1.6% OF THE WORK FORCE (FROM 3.4% TO ABOUT 6.2% OF THE CURRENT UNEMPLOYMENT.)</p>			

* EXCEPT TEAMSTERS

7

2

4 days

2

1 day

1

1

53

3

3 days

71

12

243